We claim:

1. An apparatus, comprising:

a fiber having an electrically conductive outer surface and having an average diameter of less than about 5 millimeters; and

a dielectric polymeric layer comprising a polymer having a main polymer chain on said outer surface, said dielectric polymeric layer having a thickness of less than about 50 microns, said main polymer chain comprising carbon.

2. The apparatus of claim 1, in which said dielectric polymeric layer comprises dipolar moieties having a dipole moment of at least about 1 Debye.

3. The apparatus of claim 2, in which said dielectric polymeric layer comprises a polymer selected from the group consisting of polycarbonates, polyimides, poly (ethersulfones) and polyacrylates.

4. A method for making a coated fiber, comprising the steps of:

providing a fiber having an electrically conductive outer surface and an average diameter of less than about 5 millimeters; and

forming a dielectric polymeric layer comprising a polymer having a main polymer chain on said outer surface, said dielectric polymeric layer having a thickness of less than about 50 microns, said main polymer chain comprising carbon.

5. The method of claim 4 comprising the further steps of:

providing a solution of a polymer comprising dipolar moieties having a dipole moment of at least about 1 Debye; and

forming said dielectric polymeric layer from said solution.

6. The method of claim 4, further comprising the step of forming said dielectric polymeric layer on said outer surface by dip-coating said fiber with a solution, the solution comprising a precursor for said dielectric polymeric layer.

7. The method of claim 5, in which said dielectric polymeric layer comprises a polymer selected from the group consisting of polycarbonates, polyimides, poly (ethersulfones) and polyacrylates.

8. A fiber transistor, comprising:

an insulating fiber having an average diameter of less than about 5 millimeters;

a gate electrode on said insulating fiber;

a dielectric polymeric layer comprising a polymer having a main polymer chain on said gate electrode, the dielectric polymeric layer having a thickness of less than about 50 microns, said main polymer chain comprising carbon;

a semiconductor layer and source and drain electrodes on said dielectric polymeric layer, said source and drain electrodes being in contact with said semiconductor layer;

said fiber transistor having an on/off ratio of at least about 10.

9. The fiber transistor of claim 8, in which said dielectric polymeric layer comprises dipolar moieties having a dipole moment of at least about 1 Debye.

10. The fiber transistor of claim 8, in which said source and drain electrodes form spaced apart spirals around a circumference of said dielectric polymeric layer, said source and drain electrodes being in contact with said semiconductor layer.

11. The fiber transistor of claim 8, in which the semiconductor layer has a charge carrier mobility of at least about 0.01 cm^2/Vs.

12. The fiber transistor of claim 9, in which said dielectric polymeric layer comprises a polymer selected from the group consisting of polycarbonates, polyimides, poly (ethersulfones) and polyacrylates.

13. A fiber transistor, comprising:

an insulating fiber having an average diameter of less than about 5 millimeters;

a semiconductor layer and source and drain electrodes on said insulating fiber, said source and drain electrodes being in contact with said semiconductor layer;

a dielectric polymeric layer comprising a polymer having a main polymer chain on said semiconductor layer, the dielectric polymeric layer having a thickness of less than about 50 microns, said main polymer chain comprising carbon; and

a gate electrode on said dielectric polymeric layer;

said fiber transistor having an on/off ratio of at least about 10.

14. A method for making a fiber transistor, comprising the steps of:

providing an insulating fiber having an average diameter of less than about 5 millimeters;

forming a gate electrode on said insulating fiber;

forming a dielectric polymeric layer comprising a polymer having a main polymer chain on said gate electrode, the dielectric polymeric layer having a thickness of less than about 50 microns, said main polymer chain comprising carbon;

forming a semiconductor layer and a source electrode and a drain electrode on said dielectric layer, said source and drain electrodes being in contact with said semiconductor layer;

in which said fiber transistor has an on/off ratio of at least about 10.

15. The method of claim 14 comprising the further steps of:

providing a solution of a polymer comprising dipolar moieties having a dipole moment of at least about 1 Debye; and

forming said dielectric polymeric layer from said solution.

16. The method of claim 14, comprising the further step of forming said dielectric polymeric layer on said gate electrode by dip-coating said fiber in a solution, the solution comprising a precursor for said dielectric polymeric layer.

17. The method of claim 14, comprising the further step of forming source and drain electrodes as spaced apart spirals around a circumference of said dielectric polymeric layer, the semiconductor layer forming a channel region between said source and drain electrodes.

18. The method of claim 15, in which said dielectric polymeric layer comprises a polymer selected from the group consisting of polycarbonates, polyimides, poly (ethersulfones) and polyacrylates.

19. The method of claim 17, comprising the further step of masking said dielectric polymeric layer prior to said step of forming source and drain electrodes, the step of masking including spirally winding a plurality of masking filaments onto said dielectric polymeric layer.

20. A method for making a fiber transistor, comprising the steps of:

providing an insulating fiber having an average diameter of less than about 5 millimeters;

forming a semiconductor layer and source and drain electrodes on said insulating fiber, said source and drain electrodes being in contact with said semiconductor layer;

forming a dielectric polymeric layer comprising a polymer having a main polymer chain on said semiconductor layer, the dielectric polymeric layer having a thickness of less than about 50 microns, said main polymer chain comprising carbon; and

forming a gate electrode on said dielectric polymeric layer;

said fiber transistor having an on/off ratio of at least about 10.